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Superionic H-bearing iron alloys in the Earth's inner core

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Earth's core plays a fundamental role in the evolution and habitability of our planet. Understanding its composition is key to interpreting the history of Earth's accretion. The density model suggests that the Earth's core is predominantly composed of iron (or iron-nickel alloy) with several percent of light elements, such as Si, S, C, O, and H, but their abundances in the Earth's core remain highly debated.
Seismic observations may provide important constraints on the chemical compositions of Earth's core. It was revealed that Earth's inner core transmits shear waves at anomalously low velocity. Although considerable efforts have been devoted to understanding this phenomenon in the past two decades, there is no one solution model that can match all seismic observations and geochemical constraints. In this talk, I will introduce our recent findings on H-bearing alloys under inner-core conditions. The superionic state of the inner core can explain the observed density and velocities simultaneously. Our findings reveal that hydrogen is a fundamental light element in the Earth's core.

Attendance type

Virtual presentation

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